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Evaluation of the spatial and temporal trends of dengue outbreaks in Kolonnawa Urban Council, Western province, Sri Lanka

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Dengue which is renowned as world's fastest growing vector borne disease, has become one of the major health issues in Sri Lanka gaining a growing concern due to recent outbreaks throughout the country. Timely implementation of ideal precautionary and control measures is often respected as the prime solution for controlling and reducing potential risks posed by dengue outbreaks. Recent localized trends in spatial and temporal distribution patterns of dengue play a critical role in drafting and implementing management/action plans for effective management of dengue epidemic at regional scale. Thus, a statistic and geo informatics based analysis of the recent trends in dengue distribution was carried out to identify the trends in spatial and temporal distribution patterns of Dengue in Kolonnawa Urban Council (KUC) area (6.9283° N, 79.8950° E). Monthly records of dengue cases in 2013 and 2014 in each Grama Niladari (GN) Division (13) of KUC area were obtained from the Public Health Division of KUC. The collected data from each GN Division were then subjected to a graphical analysis (scatter plot analysis) in MINITAB (version 14.12.0) to identify the temporal patterns in dengue cases. Spatial maps of the recorded dengue case distribution in each GN Division for each month and for the whole study period were prepared using Arc GIS 10.1. The spatial and temporal variation of dengue outbreak distribution within the KUC at GND level were analyzed to identify the recent trends in dengue distribution. Significant temporal variation in dengue outbreak distribution were recognized in all GN Divisions, which is mainly influenced by the rainfall pattern, and Government and community based dengue controlling practices. Sedawatta Meethotamulla, Dahampura, Kolonnawa, Salamulla and Wellampitiya localities indicate relatively high susceptibility to dengue outbreaks while localities such as Wadulla and Gajabapura indicate less susceptibilities. The land use types, management actions taken by the Government and other relevant entities, public awareness and community participation act as the key factors that govern the trends in spatial distribution of dengue outbreaks. Thus the evaluation of the trends in temporal and spatial distribution of dengue outbreaks at the localized level, could be recommended for the government sector and other relevant entities in developing and implementing action plans to control the rise of dengue and also to evaluate the effectiveness of already implemented practices for reducing and controlling dengue outbreaks at regional scale.

Keywords: Dengue, GIS, temporal, spatial, trends